

## FROM THE GREAT LAKES TO THE SEA.

BY J. G. BOURINOT.

NO fact illustrates more clearly the enterprise and energy of the leading men of the Dominion than the large number of railways and other public undertakings, that are either in progress or in contemplation, at the present time, in every province of Canada. A considerable portion of the Intercolonial Railway will be completed in the course of the present summer, and the tourist will be able, in the autumn, to travel by rail from St. John to Halifax. The "North Shore," the "River du Loup and Fredericton," and the "St. Francis and Megantic" Railways are works which must give a great stimulus to the commerce and industry of the province of Quebec. In Ontario there are numerous lines engaging public attention and about to receive valuable assistance from the well-filled treasury of that province. The Canadian Pacific Railway will probably be undertaken by a company of Canadian capitalists, in the course of the present year, which must always be memorable as dating the commencement of a new era in the history of commercial enterprise and railway construction throughout the Dominion.

But, among the public works necessary to the expansion of the commerce of Canada, none occupy a higher or more important place than the canals which have been constructed for the improvement of inland navigation. These canals have already cost the people over twenty millions of dollars; but every one admits that never was public money more wisely expended, and is prepared to vote as much more to develop works so essential to the commercial prosperity of the Confederation. It is only necessary to consider the topographical features

of the Dominion to see the importance of these works in an intercolonial and national point of view. The eastern provinces are flanked by the Atlantic, while British Columbia rests on the Pacific, and between those two oceans lies a vast territory of which the St. Lawrence and Mackenzie rivers are the principal arteries. The Mackenzie runs through an unknown wilderness and empties itself into the lonely waters of the Arctic regions. Perhaps, in the far future, it may have an important part to play in the development of the commerce of that now unknown North-west, but, at present, it is of no value to the people of Canada. The St. Lawrence river, on the other hand, is exercising and must always exercise an important influence upon the political, as well as commercial destinies of the communities of the Confederation. It is already the natural avenue of communication for many millions of people, and one of the principal auxiliaries of the commercial enterprise of America. It runs through a territory where the climate is bracing and healthy, and nature produces in great abundance. It bears to the ocean, after running a course of over 2,000 miles, the tribute of the Great Lakes, which have been calculated to contain almost half the fresh water of the world, and not far from twelve thousand cubic miles of fluid. Along the course of its navigation there are communities not surpassed by any in energy, and all those qualities which make peoples great and prosperous. Its natural beauties have long been the theme of the admiration of European travellers, from the days that Cartier and Champlain first sailed on its waters, and gave France the right to claim the owner-

ship of more than half the continent. It is where nature has been most capricious, where falls and rapids awe the spectator by their tumultuous rush, that we now see the evidences of modern enterprise; where the Indian in old times carried his canoe, we now find splendid structures of masonry, illustrating the progress of engineering skill, and the demands of commercial enterprise in a country whose total population in the beginning of the century was hardly above a hundred thousand souls.

It is not necessary that a person should fall under the category of "the oldest inhabitant," to whom reference is so frequently made in newspaper paragraphs, in order to remember the different steps in the progress of canal development in this country. The oldest canal—the Lachine, only dates back as far as 1821, and between then and 1840, were the Rideau, Ottawa and St. Lawrence canals, constructed and put into operation. It was not, indeed, until some time after the union between Quebec and Ontario that measures were taken to enlarge the St. Lawrence and Welland canals to their present capacity. The idea that first originated works like the Rideau and Lachine was the necessity of giving additional facilities for the transport of troops and supplies in the case of the outbreak of hostilities between England and the United States. In the case of the Welland, however, commercial views predominated: for sagacious men, of whom the late Mr. Merritt was the leader, foresaw the rapid development of the magnificent country, of which the St. Lawrence and Great Lakes are the natural outlet. The Welland canal is an admirable illustration of the difficulties which the promoters of great projects have to contend against in the inception of such enterprises. The company which undertook its construction commenced on a very humble scale, and were a long while engaged, with very little success, in endeavouring to enlist the support and sympathy of the cap-

italists of Canada. Constantly in difficulties, they were always before Parliament soliciting provincial assistance; and at last wearied out by their importunities, and conscious of the importance of the project, the government decided that it was desirable for the public interests to purchase all the property and make the canal a public work. The whole expenditure by the government on the canal, at the time they assumed control, was nearly two millions of dollars. It is interesting to notice that nearly all our canals were constructed in the first instance in accordance with plans and reports made by eminent engineers of the British service. The Rideau canal was commenced and carried out under the direction of Colonel By, who arrived in this country in 1826, and whose name was for many years given to the present political capital of the Dominion. The St. Lawrence canals were enlarged in pursuance of the recommendations of Colonel Philpotts who was instructed by the Earl of Durham, to make up a report on the whole question of the canal system of Canada.

It would not be very interesting to follow, step by step, the different stages in the improvement of the canals, and it will be sufficient for our present purpose to give a few details exhibiting their dimensions. The canal which connects Lake Superior with Lake Huron is a work of large size, but it is owned by the people of the United States:—and consequently it has long been among the aspirations of the inhabitants of Ontario to have internal communication of their own in that part of the Dominion. The Canal Commissioners in their report recommend the construction of a canal on the Canada side, where every condition seems favourable, and there is no doubt that, before many years pass by, the work will be in operation. At present, however, the first canal to which we have to refer is a work which has been of great benefit to Ontario—in fact, the only work which has returned

anything like a per-centage on the public money invested by the old Province of Canada. The Welland Canal connects Lake Ontario with Lake Erie, and thereby avoids the Falls of Niagara. The main line from Lake Ontario to Lake Erie has a length of 27 miles and 1,099 feet; 3 pairs of guard gates, and 27 lift locks, 2 of 200 x 45, 24 of 150 x 26½, 1 of 230 x 45; with a depth of water on sills of 10¼. Then we have the Welland River branches, which have one lock at the Aqueduct, and one at Port Robinson, each being 150 x 26½; with a depth of water of 9 feet 10 in. Next comes the Grand River Feeder, 21 miles in length, with 2 locks—1 of 150 x 26½ and the other 200 x 45, having 10¼ feet of water. The Port Maitland Branch is only 1¾ miles in length, with one lock 185 x 45, giving 11 feet of water. From these figures it will be seen that there is nothing like uniformity in the size of the locks on the main line, whilst its depth of water is not equal to that on the Port Maitland Branch.

Passing down Lake Ontario, we come to the Williamsburg series of Canals, which have been constructed to avoid the Galops, Iroquois and other rapids which obstruct navigation on the St. Lawrence River. These Canals are known as the Farran's Point, the Rapide Plat, and the Galops; they have a total length of 12¾ miles, six locks of 200 x 45 feet, with 9 feet depth of water on sills. Then we come to the Cornwall Canal, which extends from Dickenson's Landing on the north side of the river, to the town of Cornwall, with the object of surmounting the obstructions known as the Long Sault Rapids, and has a length of 11½ miles, 7 locks of 200 x 55, with 9 feet of water. Further on, our progress is arrested by the very tumultuous rapids called the Cascades, Cedars, and Coteau, which are overcome by the Beauharnois Canal, which is 11½ miles long, with 9 locks of 200 x 45, and 9 feet of water. Passing into Lake St. Louis we find navigation is impeded by the rapids best known as

Lachine, and here again public enterprize has met the requirements of commerce by the construction of a canal, which was first suggested in 1791 by the military authorities, but actually opened in 1821. This work is 8½ miles long, and has 5 locks of 200 x 45, three of which have 9 feet of water on sills, while the other two have been deepened to 16 feet so as to admit sea-going vessels into the basin of the Canal at Montreal.

Besides the great works intended to facilitate the navigation of the St. Lawrence, we have others of commercial importance on the Ottawa, the Richelieu, and the Rideau. The works on the Ottawa were constructed, as well as those on the Rideau River, chiefly for military reasons under the auspices of the British Government, and are known as the Carillon, Chute à Blondeau, and the Grenville, all necessary to overcome the natural obstacles of the river. Altogether they have a length of 8⅞ miles, including the St. Anne lock, situated at the junction of the Ottawa and St. Lawrence, where still stands that quaint little village, with its church rising out of the surrounding white-washed cottages, which the poet Moore has immortalized in his musical verses. The locks of these canals vary in size, and depth of water, the greatest being 6½; but the works are now being enlarged so as to have, eventually, locks with a capacity of 200 feet in length of chamber between the gates, 45 feet in width, and 9 feet draught of water over the mitre sills. Then, there is the Richelieu and Lake Champlain route of navigation which extends from the mouth of the Richelieu, forty-six miles below Montreal, to the outlet of Lake Champlain on the frontier line of Canada and the United States, or a distance of eighty-one miles within Canadian territory. The canals on this route, by which the greater portion of Canadian sawn lumber reaches Albany and New York, are the St. Ours' lock and dams and the Chambly Canal, the former one-eighth of a mile, and the latter 12 miles in

length. The lock on St. Ours, is 200 x 45, with 7 feet of water, whilst those on the Chambly are 122 x 23 to 23  $\frac{7}{12}$ , with a depth of water of 7 feet. This work is intended to avoid the rapids which fall into that beautiful expansion of the Richelieu, known as the basin of Chambly, in the vicinity of which is the picturesque height of Belœil, and the site of the old fort which so long represented the days of the French régime.

In the Maritime Provinces there are no canals of any great extent or importance. The Shubenacadie, intended to give water communication across the province of Nova Scotia by connecting the harbour of Halifax with the river just named, which falls into Cumberland Basin, has never been turned to account, although large sums of money have been expended in opening it up. The only canal which is actually in operation is that which connects the picturesque Bras d'Or Lake in Cape Breton with St. Peter's Bay, and consequently with the Atlantic Ocean. The whole length of this work is some 2,400 feet, with one tidal lock, 26 x 122, with 13 feet at lowest water.

No country in the world can show a more elaborate system of inland navigation than Canada, young as she is, can exhibit. It is in itself a forcible illustration of the public spirit which has animated our public men during the past thirty years. These works were commenced at a very early period in the history of the commercial progress of this country, and were completed, on their present extensive scale, at a time when the expenditures required to accomplish the object, seemed altogether excessive when compared with the actual revenues. Soon after, the Canadas were united into a Legislative Union—the Legislature voted the sum of two millions of dollars for canal enlargement, and yet the whole population of the Province was only a little above a million souls, whilst the total revenue was below a million and a half of dollars. The public

men of those days, however, like the statesmen of the present, fully recognized the necessity of such improvements, and believed that the returns which the exchequer would eventually receive from the development of industry and commerce would soon reimburse the country for any outlay, however large it might seem at the outset: and the issue has more than proved the wisdom of their enterprize and liberality.

By a reference to the statistics of the Canals we have given in the foregoing paragraphs, it will be seen that there is nothing like uniformity in the size of the locks or the depth of water, and consequently a vessel that passes through the Welland cannot find an outlet by the St. Lawrence Canals. It is in many respects to be regretted that these works of the St. Lawrence navigation were not constructed at the outset on a uniform principle—since the requirements of commerce would have been decidedly subserved but the history of our public works shows that they were undertaken at different times and under various circumstances. When they were first undertaken and brought to their present dimensions, few persons contemplated the possibility of their being unequal to the demands of commerce for half a century at least—but the development of the country has made such remarkable progress, that these canals, extensive as they are, have, for some time, proved unequal to the task imposed upon them. Along the route of the St. Lawrence navigation, from Quebec to the head of the Great Lakes there is an immense population, full of activity and enterprize, building up towns and cities, with unparalleled industry, and ever seeking greater facilities to increase their wealth. The history of Montreal, Toronto, Chicago, Milwaukee, and other western cities, aptly illustrates the energy of the Anglo-Saxon or Teutonic on this continent. "Muddy little York" has been metamorphosed, in some thirty years, into a city of colleges, commercial palaces, and splendid

mansions, and a never-ceasing tide of traffic keeps pouring into its spacious warehouses. Chicago which, above all other places, illustrates western progress, was unknown to the commercial world thirty years ago, but now it has a population of at least 300,000, and even the fearful march of the Fire-king does not seem to have paralysed the enterprize of the men who have made it what it is, and must long remain the greatest mart of the West. The total value of the trade of the lakes was not much more than \$60,000,000, thirty years ago, but now it is estimated at \$800,000,000 : while the tonnage that floats on these waters must be at least 600,000 tons, representing probably \$18,000,000 in value. Ontario raises some 30,000,000 bushels of wheat annually, besides large quantities of barley, and has now a population of 1,620,823, against 77,000 in 1821. The total population of the grain-growing States of the North-west, viz : Ohio, Michigan, Indiana, Illinois, Missouri, Iowa, Wisconsin, Minnesota, and Kansas, is about 12,000,000, against 3,000,000 thirty years ago; whilst they raise, in the aggregate, some 160,000,000 bushels of wheat, and 600,000,000 bushels of corn. The progress of this splendid territory is ever onward, and the wilderness of to-day is a scene of industry to-morrow—while the question that is ever on the lips of the merchants and farmers of this grain-growing region is this : How and

where to find the best and cheapest outlet for our surplus produce?

This question has been perplexing to commercial men of the West for some years. They have long since recognized the fact that the Erie Canal—we may leave the Mississippi altogether out of the calculation, when the transport of grain is concerned—and the splendid railway system which American enterprize has constructed to assist the West to reach the sea-board, are altogether inadequate to meet the commercial wants of a territory, which produces in such remarkable abundance. The records of the Board of Trade, the speeches of the most sagacious and energetic public men, the columns of the public press of the West, all forcibly testify to the accuracy of the assertion. More than that, the public opinion of the West has long since pointed to the St. Lawrence as the natural outlet of their trade, with which no artificial means of communication can compete—in respect to cheapness and despatch. Even under existing circumstances, a bushel of wheat can be carried from Chicago to Montreal some ten days sooner, and some fifty per cent. cheaper, than from Chicago to New York, *via* the Erie Canal. The number of American vessels that already avail themselves of the Welland Canal for the purpose of reaching Oswego, and thereby the Erie, is very considerable—as the following returns plainly show :—

	1868.	1869.	1870.	1871.	Tolls in 1871.
American vessels.....	No. 2,932 Ton. 692,169	2,791 719,432	2,884 765,543	3,459 928,330	\$22,942.84
Canadian vessels.....	No. 3,225 Ton. 548,197	3,278 548,019	3,856 591,574	4,270 625,788	\$12,779.53

Grand total of vessels and property, up }  
and down Welland Canal, in 1871 } ..... 2,993,178 or 500,000 above 1868

Grand total of vessels and property, up }  
and down St. Lawrence Canal, in 1871 } ..... 2,251,268 or 140,000 " 1868



The American vessels that ply on the Upper Lakes have been steadily increasing in size for some years past ; for experience has proved that the larger class, especially the propeller, is the cheapest for the transport of grain and other heavy freight which seek water communications. The Welland Canal will only admit the smaller vessels, unless, indeed, those of greater tonnage are prepared to unload a considerable part of their cargo at Port Colborne, for transport by the Welland Railway, and then go through with the remaining portion. This transshipment at Port Colborne has, in fact, become an important feature of the trade in that section of the country. We learn from the latest report of the Minister of Inland Revenue that during the three months ending on the 30th of June, 1871, 133 vessels, carrying 78,425 tons of grain, transhipped the whole or a part of their cargo. Of these fifty transhipped the entire cargo—amounting to 24,037 tons. The remaining ninety-three transhipped so much as would enable them to pass the Canal with the remainder. These vessels drew from eleven feet six inches to twelve feet of water, whilst the Canal only admitted the passage of vessels drawing ten feet or less. When laden to twelve feet, their cargoes would vary from 19,000 to 24,000, and when drawing only ten feet from 14,000 to 18,500 bushels of wheat. To enable such as could otherwise pass the Canal to do so, they have transhipped from 300 to as much as 7,500 bushels. The vessels that transhipped their entire cargoes were too large for the locks, irrespective of the draught of water. The Canal Commissioners, in their report, dwell particularly on the inadequacy of the Welland to meet the necessities of Western traffic, and refer to the class of vessels that it should benefit. "The tendency in ship-building," say the Commissioners, "for the last quarter of a century on the Upper Lakes, has been to construct larger vessels every-way, whether propelled by steam or sail ; while the screw is super-

seding the paddle everywhere on the lakes as well as on the ocean—the relative number and tonnage of screw steamers is gradually increasing upon the sailing craft. The Lake St. Clair Flats were in former years the accepted gauge of the navigation : but by the combined action of the Canadian and United States' Governments the obstacles in the lake have been so far removed that vessels can now pass through, drawing 14 feet. Then, again, as the line of navigation is extended, so the long voyage demands larger tonnage. As an approximate rule for the size of a vessel for any particular route, it has been observed that any vessel, to be properly adapted to its business, should have one ton of measurement for every mile of her voyage ; and as an example, in illustration of the rule, it may be remarked that the vessels plying between Chicago and Buffalo, 916 miles, now range between 600 and 1,500 tons, while many persons of considerable experience in the trade are of opinion that a medium size of about 1,000 tons is best suited for this route."

It has been the universal sentiment of the country for some years past that the canal system should be improved at the earliest opportunity when the condition of the finances warranted the outlay that such improvements would necessarily entail. The Quebec Convention in 1865 passed a resolution to this effect—and the Government of the Dominion in 1870 appointed a Commission composed of practical business men of high standing in the country, to examine into the whole question of canal enlargement. Their Report has been for a twelve-month before the people of the Dominion, and has been generally considered as doing complete justice to the great interests involved. The government, in fact, have adopted the report as the basis of improvements which are to commence forthwith, and which comprise the enlargement of the St. Lawrence and Welland canals, so that the large propeller and other craft which are now confined to

the upper lakes will be able to proceed from the western ports to Montreal and the Atlantic ports without trans-shipment at Kingston and other places. These canals will be enlarged on a uniform system, so that all the locks will have 270 feet length of chamber between the gates, 45 feet in width, and 12 feet of clear draught over the mitre sills. Measures are also in progress to improve the navigation of the St. Lawrence river between Montreal and Quebec, with the view of allowing the largest ships to come up directly to the former city and, in order to attain this result it will be necessary to deepen Lake St. Peter to 24 feet, and otherwise make it equal to the passage of the sea-going crafts in question.

A work of great magnitude is also to be constructed in the Maritime Provinces. If our readers will take up a map of Nova Scotia, they will notice how narrow is the Isthmus of Chignecto, that separates that province from New Brunswick, and will at once be struck with the fact that a canal across that neck of land must afford immense facilities to commerce. The total distance across the Isthmus is only fifteen miles, and the country is level and easily excavated; but, nevertheless, there have been some engineering difficulties suggested on account of the difference in the range of tides. Few spectacles of nature are more calculated to awaken awe in the mind of the spectator than the irresistible march of the tides of the Bay of Fundy into its various estuaries. "At low tide"—we quote from Dawson's geology—"wide flats of brown mud are seen to extend for miles, as if the sea had altogether retired from its bed, and the distant channel appears a mere strip of muddy water. At the commencement of flood, a slight ripple is seen to break over the edge of the flats. It rushes swiftly forward, and covering the lower flats almost instantaneously, gains rapidly on the higher swells of mud, which appear as if they were being dis-

solved in the turbid waters. At the same time the torrent of red water enters all the channels, creeks, and estuaries—surging, whirling, and foaming, and often having in its front a white, breaking wave, or 'bore' which runs steadily forward, meeting and swallowing up the remains of the ebb still trickling down the channels. The mud flats are soon covered, and then, as the stranger sees the water gaining with noiseless and steady rapidity on the steep sides of banks and cliffs, a sense of insecurity creeps over him, as if no limit could be put to the advancing deluge. In a little time, however, he sees that the fiat, "hitherto shalt thou come and no farther," has been issued to the great bay tide. Its retreat commences, and the waters rush back as rapidly as they had entered." The extreme range of tides in Bay Verte does not reach beyond eight feet, while high water in Cumberland Bay rises about 23 feet above the level of medium tides. These and other obstacles, however, can be surmounted; and it is proposed to go on with a work which must give a remarkable stimulus to the commerce of the Maritime Provinces. The canal will render more accessible a vast amount of mineral wealth which now wants a market. By affording a shorter and cheaper route than that round the Atlantic coast of Nova Scotia, freights will be lessened and the transport of heavy merchandise to Canadian ports on the St. Lawrence stimulated. With the completion of this work, the inland navigation of the Dominion may be considered perfect: for the large propellers of the west will be able to make a rapid and secure voyage without breaking bulk from Chicago to Boston or Portland.

Not only will Canada control the transport of the surplus produce of the Great West, but she must develop a large Intercolonial trade, the moment her canal system is enlarged and perfected from Erie to the Bay of Fundy. Commercial men have long

urged that we cannot see any extensive trade between Ontario and the Maritime Provinces until there are facilities for the passage of craft drawing, at least, twelve feet of water. Ontario wants Nova Scotia coal and minerals; but she cannot have them until a vessel can go direct from Pictou or Sydney to Hamilton or Toronto, and there unload and take in a return-cargo of flour or barley. The development of Intercolonial trade and the control of the commerce of the North-Western States are the objects which Canadians expect immediately to attain by the improvement of these splendid works; but, looking into the future, we see the time, when they will be equally invaluable to that Great West which Canada claims as her own. The day is not far distant when Manitoba will be the home of a large population; and energetic and prosperous communities will be settled from the head of Lake Superior, along the line of the Canadian Pacific Railway—as far as the shores of the Pacific Ocean. Already words of the poet are in course of realization:—

“Behind the scared squaw’s birch canoe,  
The steamer smokes and raves,  
And city lots are staked for sale  
Above old Indian graves.

“I hear the tread of pioneers  
Of nations yet to be,  
The first low wash of waves, where soon  
Shall roll a human sea.”

Two decades hence, there will be a steady stream of traffic from those fertile regions which are now a wilderness, to give employment to our shipping and our railways. Then, no doubt—if indeed it is not done very soon—the demands of commerce will require the construction of the Ottawa Canal, which will afford a shorter route between the Lakes and Montreal, and considerably relieve the St. Lawrence canals of the superabundant traffic which will be waiting its turn to pass through the locks. Then the riches of the countries washed by the China sea will pass through our country on their way to Europe, in Canadian ships. If the Maritime Provinces continue to exhibit the same enterprise they have hitherto—an enterprise which has placed Canada in the proud position of ranking only below France as a maritime power—they may expect to be the carriers of that immense trade which must necessarily follow the St. Lawrence route and the Pacific Railway. All this is no fancy picture. The shrewdest business men amongst us have pressed the enlargement of our canal system and the construction of the Canadian Pacific, as certain to increase the wealth and population of the Confederation to an incalculable degree. All that Canada requires now is peace and security from all disturbing influences to work out a career of prosperity unexampled in the history of the commercial communities of the world.